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F. B. Meek

MEMOIRS  
OF THE  
GEOLOGICAL SURVEY  
OF  
THE UNITED KINGDOM.

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*Figures and Descriptions*

ILLUSTRATIVE OF  
BRITISH ORGANIC REMAINS.

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DECADE III.

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PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF HER MAJESTY'S TREASURY.

LONDON:  
PRINTED FOR HER MAJESTY'S STATIONERY OFFICE:  
PUBLISHED BY  
LONGMAN, BROWN, GREEN, AND LONGMANS.  
1850.

## NOTICE.

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PALÆONTOLOGICAL researches forming so essential a part of geological investigations, such as those now in progress by the Geological Survey of the United Kingdom, the accompanying plates and descriptions of British Fossils have been prepared as part of the Geological Memoirs. They constitute a needful portion of the publications of the Geological Survey, and are taken from specimens in the public collections, or lent to the Survey by those anxious to advance this branch of the public service.

The plan proposed to be followed in the work, of which this Decade forms a part, is as follows :—

To figure in elaborate detail, as completely as possible, a selection of fossils, illustrative of the genera and more remarkable species of all classes of animals and plants the remains of which are contained in British rocks ; to select especially such as require an amount of illustration which, to be carried out by private enterprise, would require a large outlay of money, with little prospect of a return, and a long time to accomplish, but which, by means of the staff and appliances necessarily employed on the Geological Survey, can be effected at small cost, and with a rapidity demanded by the publication of the Maps and Memoirs of the Survey ; thus, it is hoped, affording an aid to those engaged in the sciences with which this work is connected, that they might not otherwise have possessed, and which may materially promote the progress of individual research.

H. T. DE LA BECHE,  
*Director-General.*

*Geological Survey Office, Jermyn Street,  
30th June, 1850.*

## BRITISH FOSSILS.

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### DECADE THE THIRD.

THE third Decade of representations of British Fossils follows up the subject of the first, and continues the series of illustrations of the genera and species of extinct Echinodermata, especially those belonging to the orders *Asteriadae* and *Echinidae*.

The genera illustrated in this Decade are partly new, partly long-established ; so also with the species, some of the most remarkable of unpublished forms having been selected, as well as some of the commonest and best known fossils. Yet, even respecting those which are so familiar that their whole history is believed to have been long ago made out, there is so much to be cleared up, so many points of structure hitherto very imperfectly or not at all elucidated, and such an accumulation of synonyms, that their investigation is much more laborious, and occupies much longer time, than inquiries into entirely new types. Thus, three of the fossils figured and described in this Decade, *Hemicidaris intermedia*, *Galerites albogalerus*, and *Micraster cor-anguinum*, are so familiar to geologists and naturalists, so abundant and so well preserved, that authors do not hesitate to cite them without comment, as if they were free from any obscurity. Nevertheless, I may say confidently, that not until now has the literature of these well-known and often-described forms been cleared up, and many of the most important points in their organization made known. Common as they are, no representations of them, presenting sufficient details of their structure, have ever appeared before.

Among the new forms now first described and figured, some are of singular interest. Two of them, the *Lepidaster Grayii* and the *Tropidaster pectinatus*, are not only new as species, but unquestionably possess features entitling them to become the types of new genera. Of those

belonging to old genera, the *Uraster Gaveyi* is singularly interesting, presenting, as it does, the spectacle of a Liassic echinoderm, which so closely resembles the commonest star-fish now living in the British seas, that it can only be distinguished from it by a minute and critical comparison; and the *Hemicidaris Purbeckensis* is remarkable as being the first member of its tribe ever discovered in strata of the Purbeck series.

The species described and figured have been selected from formations of different geological epochs. From Silurian rocks *Lepidaster Grayii* has been taken; from older secondary strata, the two forms of *Hemicidaris*, the *Galerites (Holectypus) hemisphærica*, chosen on account of its being new to Britain, and also affording an excellent illustration of the sub-genus to which it belongs, and the *Dysaster ringens*, selected for the same reasons; also the new star-fishes, species of *Uraster* and *Tropidaster*, already alluded to. Of cretaceous fossils there are the critical *Galerites castaneus*, and the characteristic *Galerites albogalerus* and *Micraster cor-anguinum*.

A third series of illustrations of the fossil Echinoderms is far advanced, and in preparation for publication.

EDWARD FORBES.

June, 1850.

# BRITISH FOSSILS.

## DECADE III. PLATE V.

### HEMICIDARIS PURBECKENSIS.

[Genus HEMICIDARIS. AGASSIZ. (Sub-kingdom Radiata. Class Echinodermata. Order Echinidæ. Family Cidarites.) Body sub-globose. Interambulacral segments very broad, bearing (few) primary perforated tubercles, placed on crenated mammillary elevations; ambulacral areas very narrow, furnished with primary tubercles on their lower portions; pores in single file, except close to the mouth, where they are ranged in threes; summit crowned with a disk composed of five ovarian and five ocular plates surrounding a central anus; spines of two orders, the primaries long, cylindrical, mostly of considerable dimensions, the secondaries small, compressed.

*Hemicidaris Purbeckensis.* Sp. Nov.

DIAGNOSIS. *H. testâ subglobosâ, arearum ambulacralium infra tuberculis majoribus remotis; interambulacralium numerosis (8), subdistantibus; spinis sub-compressis, lævibus, ad basin per spatium angustum striatis.*

The species of *Hemicidaris* are difficult to distinguish from each other, unless we have their spines as well as test before us. Fortunately, in the present instance, we have both; although the specimen figured is unique. The body at first glance might be confounded with that of *Hemicidaris intermedia*, but on closer examination presents distinctive characters, the value of which is confirmed when we see the wholly different features of the spines.

The body is sub-globose, depressed above, but probably, like its congeners, liable to variation in this respect. The interambulacral areas are, about the centre of the sides, rather more than three and a-half times the width of the ambulacral spaces in the same region. On each interambulacral plate there is a primary tubercle, erected on the crenated summit of an elevated smooth boss, surrounded by a smooth and defined areola. The ambulacral and centro-sutural sides of this areola are margined by rather scattered rounded granules, but not the upper and lower margins, where the areolæ of contiguous plates may be said to be in contact. The areola is wide in comparison with the boss. There are about eight primary tubercles in each row, gradually increasing in size as they approach the centre of the sides of the body. The ambulacral spaces bear in their upper portion, and for two-thirds of



their length, small secondary perforated tubercles on minute bosses, one to each plate, with scattered granules between them. On the lower third of the ambulacral areas these suddenly increase in size to twice the dimensions of those above. The large ambulacral tubercles are diffusely arranged, so as to alternate with considerable interspaces. The avenues of pores are slightly undulating. About nine pores correspond to an interambulacral central plate. The mouth in our only specimen is concealed, and the apical disk not preserved.

The spines are quite smooth, slender, and subcylindrical, slightly compressed at the sides. There is a short longitudinally striated well defined space above the swollen crenated neck. The articulating base is small.

The diameter of the specimen is one inch and two-twelfths. The diameter of the largest spine found is one-tenth of an inch.

*Affinities and Differences.*—*Hemicidaris Purbeckensis* differs from *H. intermedia* and *crenularis* in having smaller and more numerous tubercles, in proportion to the size of the body, on the interambulacral areas, and a larger granulated intermediate space in their centres; the large tubercles on the ambulacral areas, instead of being closely set as in both the species named, are scattered and alternating; the number of pairs of pores opposite each large interambulacral plate are fewer. The ambulacra are nearly straight, instead of being undulated. Above all, the spines are quite distinct in their characters.

It differs from *H. stramonium*, a Portland oolite species, said by Mr. Mc'Coy to occur in England, in having a greater number of large ambulacral tubercles, wider ambulacral areas, and much smaller interambulacral tubercles.

From *H. mitra*, also a foreign Portland oolite species, to which, like the last, it approaches in the straightness of the ambulacra, it differs in the arrangement of the interambulacral tubercles.

*H. diademata* and *Thurmanni*, foreign Kimmeridge species, have fewer interambulacral tubercles. The peculiar structure of the ambulacra of *H. alpina* sufficiently distinguish that species.

Since, except in the cases of *intermedia* and *crenularis*, the spines of the species I have mentioned are unknown, it is probable that when they shall have been found, the differences indicated will be accompanied by still more important distinctions.

*Locality and Geological Position.*—This *Hemicidaris* is peculiarly interesting as being the first *Echinoderm* ever found in the PURBECKS. It was discovered by myself at Swanage in Dorsetshire, in December, 1849. For several days I had found the spines of an urchin with which I was unacquainted among the marine fossils which occur in a zone on the summit of the well-known "Cinder-bed," composed chiefly of *Ostrea*

*distorta*, and constituting a conspicuous stratum in the middle division of the Purbecks. A careful search, during which I was rewarded by the discovery of several new forms of marine Purbeck mollusca, resulted in the finding of a very perfect specimen of the body of the *Hemicidaris*, now first described, accompanied by its spines, identical in structure with those previously observed. I have seen no traces of any other Purbeck echinoderm.

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#### EXPLANATION OF THE PLATE.

- Fig. 1. Body of the *Hemicidaris Purbeckensis*.  
 Fig. 2. Ambulacral and interambulacral plates.  
 Fig. 3. Base of a spine, natural size, 3*a*, magnified. 3*b* its section.  
 Figs. 4 and 4*a*. Portions of the spines, natural size, indicating the dimensions and proportions of those organs.
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#### *Note on the Species of Hemicidaris found in British Strata.*

At the time of the publication of Mr. Morris's "Catalogue of British Fossils" one species only of *Hemicidaris* was known as British. Since then two others have been enumerated by Professor M'Coy, in his paper "On some New Mesozoic Radiata," published in the "Annals of Natural History" for December, 1848.

I am acquainted with the following :—

1. *Hemicidaris intermedia*, Fleming; *H. crenularis* of British catalogues; common in the coralline oolite of Wiltshire; rare in Dorsetshire.—(See Decade III., pl. 4.)

2. *Hemicidaris Purbeckensis*, Forbes; the new Purbeck species now first described and figured.

3. *Hemicidaris alpina*, Agassiz. (Echin. Suiss. ii., p. 52, tab. 18, figs. 19–22.) A pretty species, easily distinguished from its congeners by the very small and thickly-set ambulacral tubercles. Our attention has been called to it by Mr. S. P. Woodward. It was found in the forest marble of Pickwick, Wilts, by Mr. Lowe of Chippenham.

4. *Hemicidaris pustulosa*, Forbes. A very fine new species from the great oolite of Minchinhampton. It forms part of the collection of Mr. Lycett, and is figured in Plate A, fig. 8, of the Monograph of Great Oolite Fossils to be published by the Palæontological Society. Its nearest ally is the *Hemicidaris diademata* of Agassiz, which it resembles in the sudden diminution and very small size of the uppermost interambulacral tubercles, but differs in having the sutural granulated space of the interambulacral areas very wide.

5. *Hemicidaris icaunensis*, Cotteau. (Echin. Foss. du Dep<sup>t</sup>. de l'Yonne, plate 3, figs. 1–5.)? I have provisionally identified with the species cited a great oolite urchin from Minchinhampton, in Mr. Lycett's collection. It is figured in plate A, fig. 9, of the Monograph of Great Oolite Fossils, published by the Palæontological Society.

6. *Hemicidaris confluens*, M'Coy. In the Monograph already quoted a great oolite Minchinhampton urchin is figured in plate A, fig. 10, which seems to agree with the description of this species.

7. *Hemicidaris*, Sp. Nov.? In the collection of the Museum of Practical Geology. Found in the cornbrash in a lane leading from Stourton Caundle to Lower Woodacre, by Mr. Bristow, of the Geological Survey. This is a fine species, very distinct from any other British one, resembling most nearly *H. intermedia*, but differing in having gradually (not suddenly) increasing ambulacral areas, with the tubercles upon them set

well apart, except below, where the larger ones are closely packed. Until the spines shall have been discovered I hesitate to give a name to this form, since it so closely agrees with the figure of the Swiss *H. crenularis*.

8. *Hemicidaris*, Sp. Nov.?—A small depressed form, with very large interambulacral tubercles, and the larger tubercles upon the ambulacral areas occupying half their length. It is imperfect, but probably distinct. It was found in the cornbrash in Dorsetshire, and is contained in the Museum of Economic Geology.

The following I have not seen :—

9. *Hemicidaris stramonium*, of Agassiz; said by Professor M'Coy to be found in the coralline oolite of Calne, Wilts. On the Continent it is known only from the strata above the Kimmeridge.

EDWARD FORBES.

June, 1850.



Geological Survey of the United Kingdom.

HEMICIDARIS  
(Oolitic)

